

In step 1, the controller finds a particular target device; that is, it finds the target device's node identifier (node ID). In step 2, the controller finds information on the target device regarding the number of plugs, the types of plugs, and other like information needed for the connection. In step 3, the controller processes this information and connects the target device to the home network. In step 4, the controller allocates bandwidth on the serial bus to the target device, if bandwidth is available. If bandwidth is available, the controller allocates a channel to the target device; otherwise, a channel cannot be allocated.

In step 5, the controller sets the output Plug Control Register (oPCR), and in step 6, the controller sets the input Plug Control Register (iPCR). In step 7, the controller can then provide commands to the target device, such as "play" or "record," depending on the intended role of the target device in the home network.

The connection process illustrated by Prior Art Figure 1 can be problematic for a number of reasons. For one, the workload required by the controller is quite extensive. In the prior art, the controller is required to retrieve the connection information, analyze it, and store it in memory. Considering just the number of plugs that can be available on a target device (as described above), the amount of information that needs to be received and processed by

the processor can be extensive. This problem is multiplied by the number of target devices present on the home network.

Consequently, the controller device is equipped with substantial processing and memory resources, which can drive up the cost of such a device. As mentioned above, in an IEEE 1394 network, any device that has sufficient resources can serve as a controller device. However, because of the processing and memory resources required, and in particular because of the expense, it is more likely that the typical consumer will have a single controller device. Consequently, the user cannot be as flexible as he or she might want to be when controlling the home network; that is, the user will likely have to control the network from a central location using a personal computer.

In addition, the amount of information that is delivered from the target device to the controller can consume some portion of the available bandwidth of the serial bus. There is a maximum rate at which the serial bus can carry data and information. When the connection information is being sent from each of the target devices to the controller, the amount of bandwidth available to other target devices is reduced. Conversely, it is also possible that there may not be sufficient bandwidth available to complete the connection process, or to complete the connection process in a timely manner.

Furthermore, it may happen that the controller receives and processes the connection information (as in steps 2 and 3 of process 10), but then cannot allocate sufficient bandwidth to the target device (as in step 4 of process 10). Thus, the controller will need to repeat the connection process until finally it is
5 successful, further consuming the resources of both the network and the controller while also inconveniencing and frustrating the user who is attempting to make a connection to the target device.

Another problem associated with prior art home networks is that the
10 output from target devices (such as VCRs) is generally sent to all output plugs. That is, owing to the complexity of the AV/C protocol, it is difficult to specify a particular output plug for the output to use, so instead the output signal is sent to all plugs, digital and analog (e.g., to the video out plug, the S-video output plug, the serial bus output plugs, and the RCA jack). Consequently, the digital output
15 is still sent out over the serial bus even if another device on the home network is not an intended recipient of the output. Thus, the available bandwidth is needlessly consumed, reducing the bandwidth available for other devices and channels.

20 In summary, as described in conjunction with Prior Art Figure 1, the responsibility for establishing a connections lies completely with the controller, leading to the problems and disadvantages described above.